Dietary Approach to Control Cardiometabolic Syndrome

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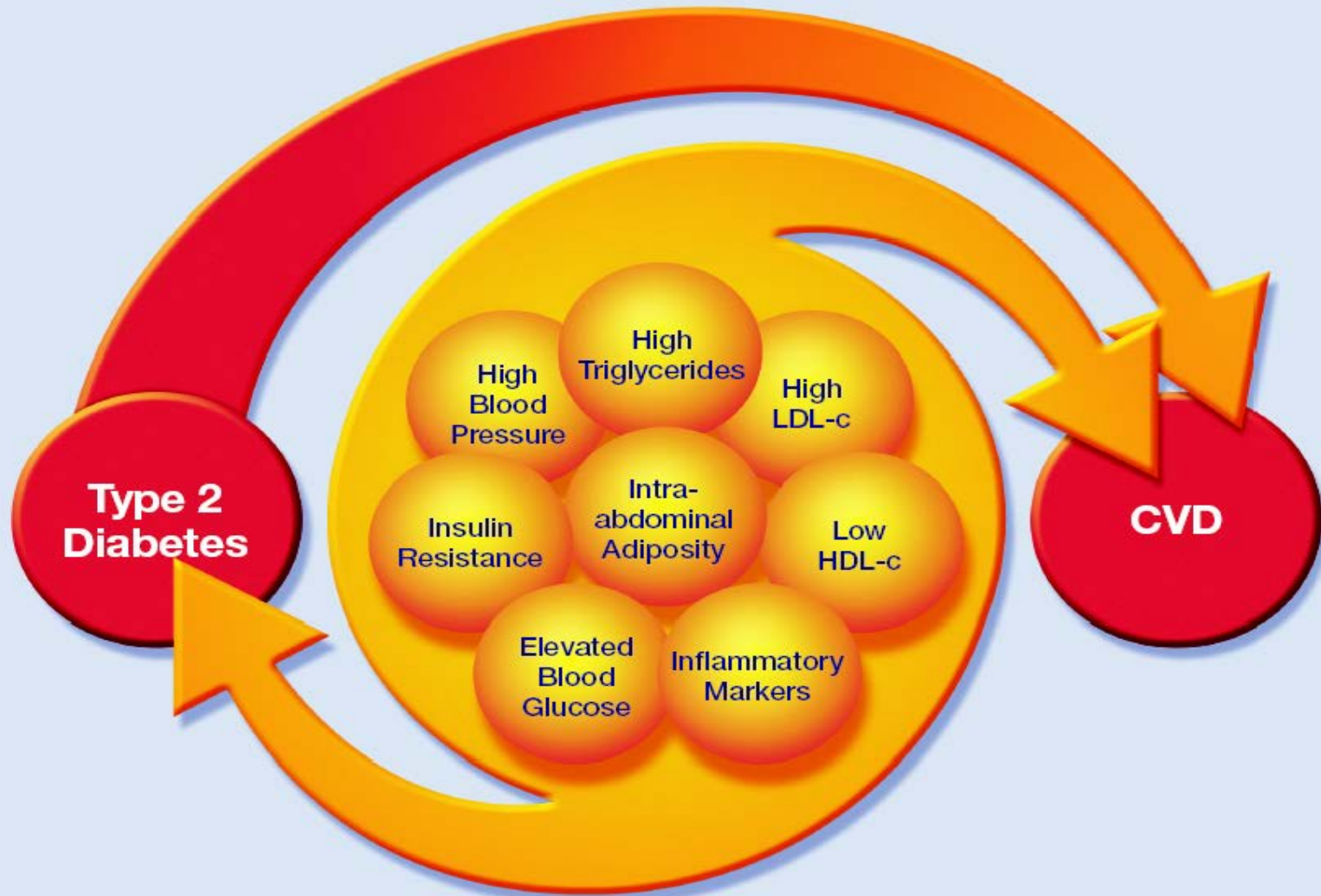
Clustering of Components:

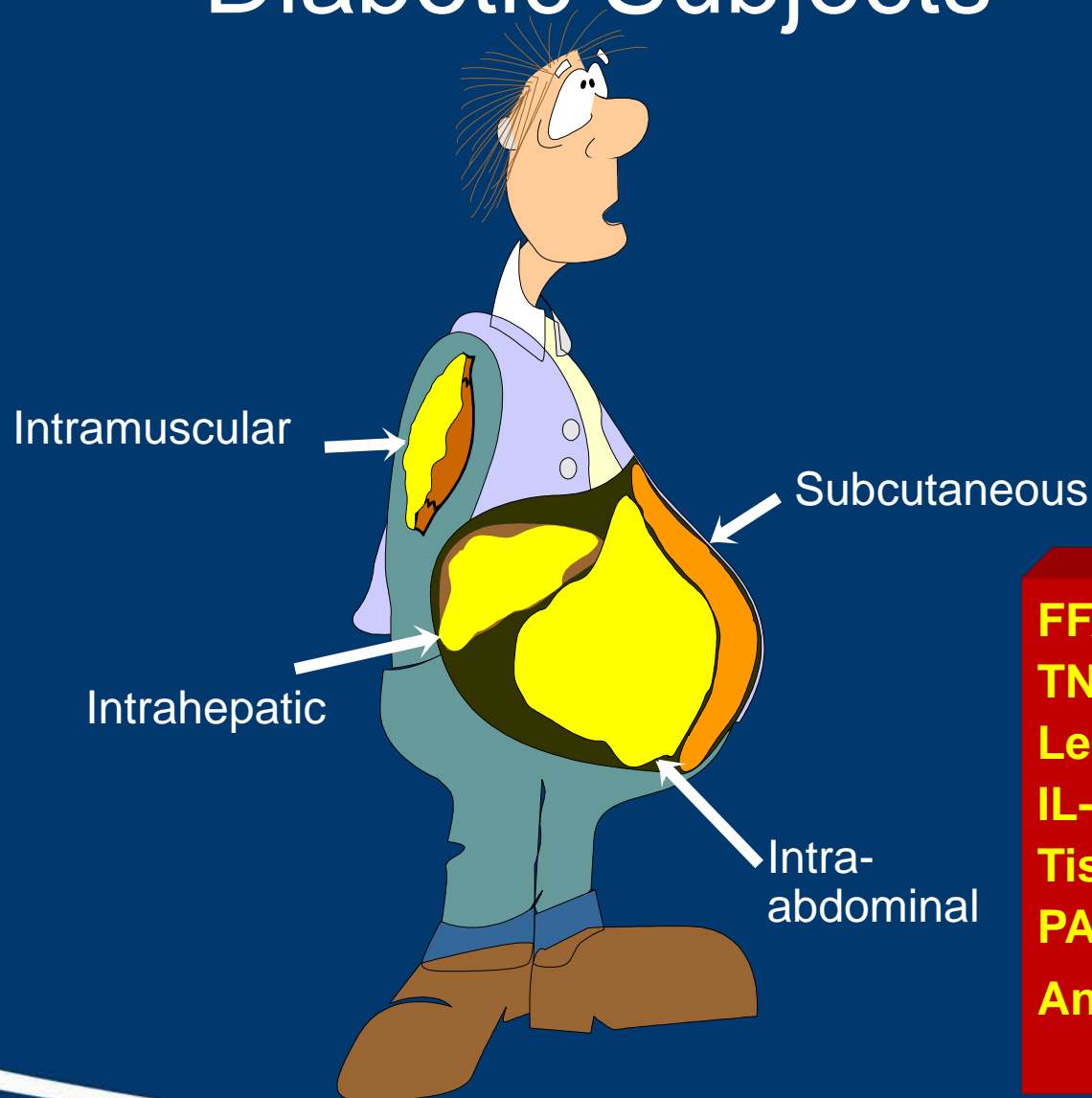
- Hypertension: BP. > 140/90
- Dyslipidemia: TG > 150 mg/ dL (1.7 mmol/L)
  HDL- C < 35 mg/ dL (0.9 mmol/L)
- Obesity (central): BMI > 30 kg/M2
  Waist girth > 94 cm (37 inch)
  Waist/Hip ratio > 0.9
- Impaired Glucose Handling: IR , IGT or DM
  FPG > 110 mg/dL (6.1mmol/L)
  2hr.PG >200 mg/dL(11.1mmol/L)
- Microalbuninuria (WHO)

Global cardiometabolic risk*

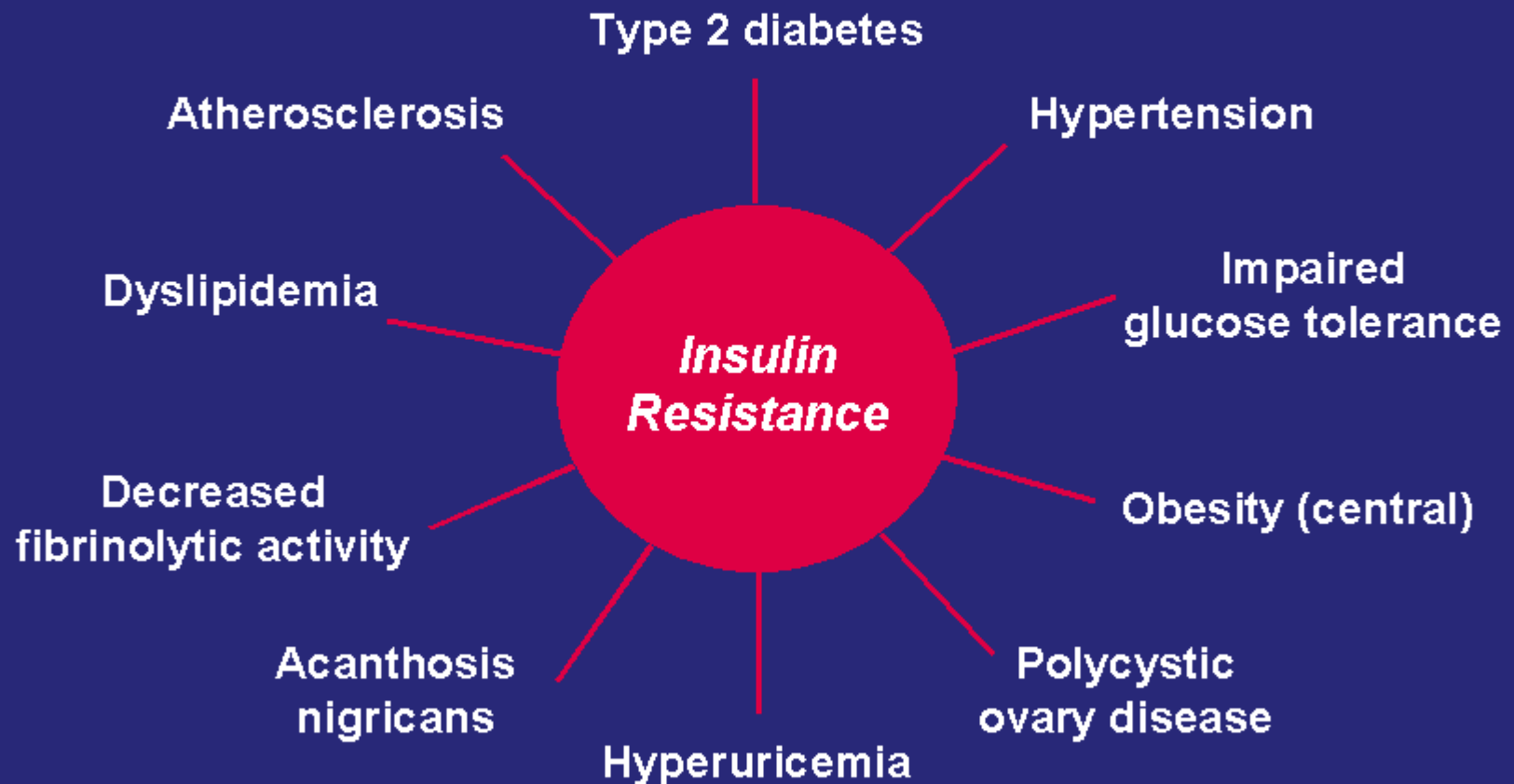
Gelfand EV *et al*, 2006; Vasudevan AR *et al*, 2005

* working definition

International Diabetes Federation (IDF) Consensus Definition 2005

The new IDF definition focusses on abdominal obesity rather than insulin resistance

Fat Topography In Type 2 Diabetic Subjects
Intramuscular
Subcutaneous
Intrahepatic
Intra-abdominal
FFA*
TNF-alpha*
Leptin*
IL-6 (CRP)*
Tissue Factor*
PAI-1*
Angiotensinogen*

Targeting

Cardiometabolic Risk

Insulin Resistance: Associated Conditions

Adapted from Consensus Development Conference of the American Diabetes Association. *Diabetes Care*. 1998;21:310-314.

Resulting Clinical Conditions:

- Type 2 diabetes
- Essential hypertension
- Polycystic ovary syndrome (PCOS)
- Nonalcoholic fatty liver disease
- Sleep apnea
- Cardiovascular Disease (MI, PVD, Stroke)
- Cancer (Breast, Prostate, Colorectal, Liver)

Multiple Risk Factor Management

- Obesity
- Glucose Intolerance
- Insulin Resistance
- Lipid Disorders
- Hypertension
- ***Goals: Minimize Risk of Type 2 Diabetes and Cardiovascular Disease***

Glucose Abnormalities:

- **IDF:**
  - FPG >100 mg/dL (5.6 mmol. L) or previously diagnosed type 2 diabetes
  - **(ADA: FBS >100 mg/dL [5.6 mmol/L])**

Hypertension:

- **IDF:**
  - BP >130/85 or on Rx for previously diagnosed **hypertension**

Dyslipidemia:

- IDF:
  - Triglycerides - >150mg/dL (1.7 mmol /L)
  - HDL - <40 mg/dL (men), <50 mg/dL (women)

Public Health Approach

Screening/Public Health Approach

- Public Education
- Screening for at risk individuals:
  - Blood Sugar/ HbA1c
  - Lipids
  - Blood pressure
  - Tobacco use
  - Body habitus
  - Family history

Life-Style Modification: Is it Important?

- **Exercise**
  - Improves CV fitness, weight control, sensitivity to insulin, *reduces incidence of diabetes*
- **Weight loss**
  - Improves lipids, insulin sensitivity, BP levels, *reduces incidence of diabetes*
- ***Goals:***

Brisk walking - 30 min./day

10% reduction in body wt.

Smoking Cessation / Avoidance:

- A risk factor for development in children and adults
- Both passive and active exposure harmful
- A *major risk factor for:*
  - insulin resistance and metabolic syndrome
  - macrovascular disease (PVD, MI, Stroke)
  - microvascular complications of diabetes
  - pulmonary disease, etc.

Diabetes Control - How Important?

Goals:

- ***FBS - premeal <110,***
- ***postmeal <180.***
- ***HbA1c <7%***
- For every 1% rise in Hb A1c there is an 18% rise in risk of cardiovascular events & a 28% increase in peripheral arterial disease
- Evidence is accumulating to show that tight blood sugar control in both Type 1 and Type 2 diabetes reduces risk of CVD

Lifestyle modification

- Diet
- Exercise
- Weight loss
- Smoking cessation

If a 1% reduction in HbA_{1c} is achieved, you could expect a reduction in risk of:

- 21% for any diabetes-related endpoint
- 37% for microvascular complications
- 14% for myocardial infarction

However, compliance is poor and most patients will require oral pharmacotherapy within a few years of diagnosis

Stratton IM *et al*. *BMJ* 2000; 321: 405–412.

BP Control - How Important?

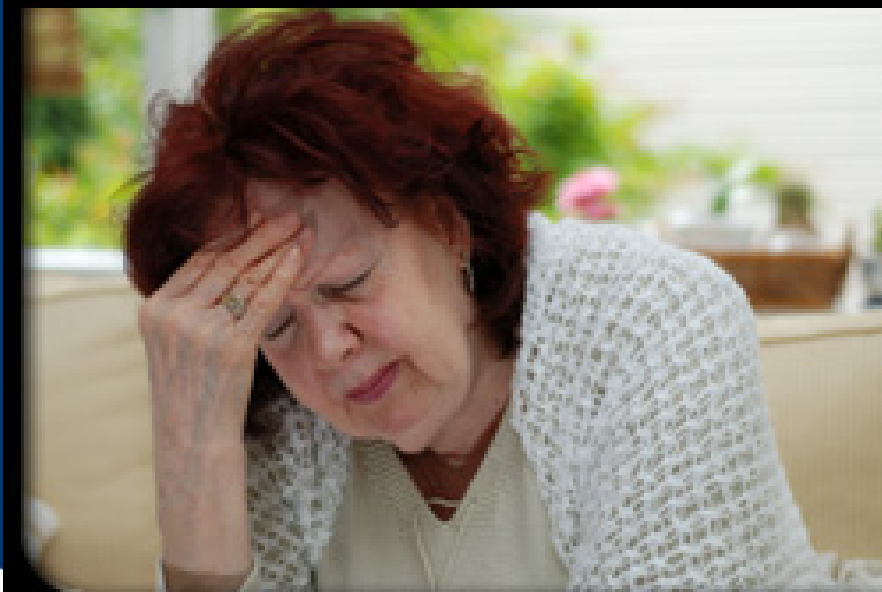
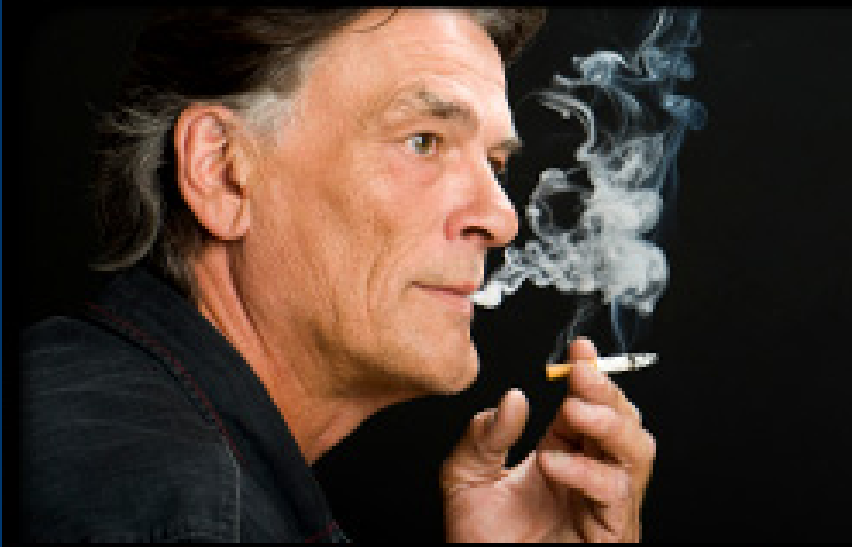
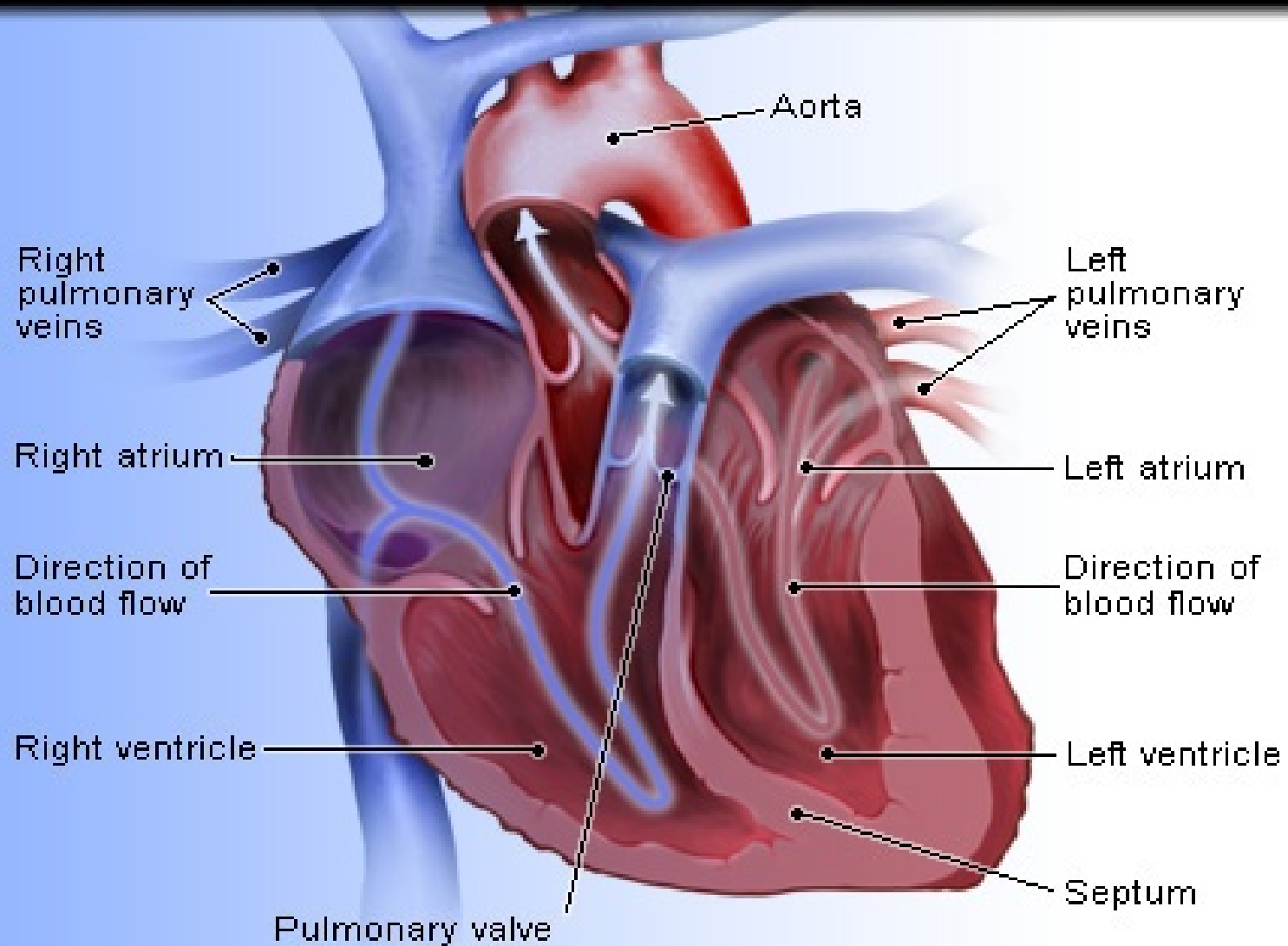
- ***Goal:*** ***BP.<130/80***
- MRFIT and Framingham Heart Studies:
  - Conclusively proved the increased risk of CVD with long-term sustained hypertension
  - Demonstrated a 10 year risk of cardiovascular disease in treated patients vs non-treated patients to be 0.40.
  - 40% reduction in stroke with control of HTN
- Precedes literature on Metabolic Syndrome

Lipid Control - How Important?

- ***Goals: HDL >40 mg% (>1.1 mmol /l)***
  LDL <100 mg/dL (<3.0 mmol /l)
  TG <150 mg% (<1.7 mmol /l)

- Multiple major studies show 24 - 37% reductions in cardiovascular disease risk with use of statins and fibrates in the control of hyperlipidemia.

Thank You

Aorta
Right pulmonary veins
Left pulmonary veins
Right atrium
Left atrium
Direction of blood flow
Direction of blood flow
Right ventricle
Left ventricle
Septum
Pulmonary valve

Determinants and dynamics of the CVD Epidemic in the developing Countries

Data from South Asian Immigrant studies

- Excess, early, and extensive CHD in persons of South Asian origin
- The excess mortality has not been fully explained by the major conventional risk factors.
- Diabetes mellitus and impaired glucose tolerance highly prevalent. (Reddy KS, circ 1998).
- Central obesity, ↑triglycerides, ↓HDL with or without glucose intolerance, characterize a phenotype.
- genetic factors predispose to ↑lipoprotein(a) levels, the central obesity/glucose intolerance/dyslipidemia complex collectively labeled as the "metabolic syndrome"

Determinants and dynamics of the CVD epidemic in the developing countries

Other Possible factors

- Relationship between early life characteristics and susceptibility to NCD in adult hood (Barker's hypothesis) (Baker DJP,BMJ,1993)
  - Low birth weight associated with increased CVD
  - Poor infant growth and CVD relation
- Genetic-environment interactions (Enas EA, Clin. Cardiol. 1995; 18: 131-5)
  - Amplification of expression of risk to some environmental changes esp. South Asian population)
  - Thrifty gene (e.g. in South Asians)

CVD epidemic in developing & developed countries. Are they same?

- Urban populations have higher levels of CVD risk factors related to diet and physical activity (overweight, hypertension, dyslipidaemia and diabetes)
- Tobacco consumption is more widely prevalent in rural population
- The social gradient will reverse as the epidemics mature.
- The poor will become progressively vulnerable to the ravages of these diseases and will have little access to the expensive and technology-curative care.
- The scarce societal resources to the treatment of these disorders dangerously depletes the resources available for the 'unfinished agenda' of infectious and nutritional disorders that almost exclusively afflict the poor

Why people physically inactive?

- Lack of awareness regarding the of physical activity for health fitness and prevention of diseases
- Social values and traditions regarding physical exercise (women, restriction).
- Non-availability public places suitable for physical activity (walking and cycling path, gymnasium).
- Modernization of life that reduce physical activity (sedentary life, TV, Computers, tel, cars).

Prevention of CVD

- There is an urgent need to establish appropriate research studies, increase awareness of the CVD burden, and develop preventive strategies.
- Prevention and treatment strategies that have been proven to be effective in developed countries should be adapted for developing countries.
- Prevention is the best option as an approach to reduce CVD burden.
- Do we know enough to prevent this CVD Epidemic in the first place.

Recommendations for treatment

Primary management for the Metabolic Syndrome is healthy lifestyle promotion. This includes:

- moderate calorie restriction (to achieve a 5-10% loss of body weight in the first year)
- moderate increases in physical activity
- change dietary composition to reduce saturated fat and total intake, increase fibre and, if appropriate, reduce salt intake.

Management of the Metabolic Syndrome

- Appropriate & aggressive therapy is essential for reducing patient risk of cardiovascular disease
- Lifestyle measures should be the first action
- Pharmacotherapy should have beneficial effects on
  - Glucose intolerance/diabetes
  - Obesity
  - Hypertension
  - Dyslipidaemia
- Ideally, treatment should address all of the components of the syndrome and not the individual components

Do you have suggestions for how I could .8
get more physical activity?

Could any medicines I'm taking be .9
affecting my metabolic syndrome risk
factors?

How might my family history affect my .10
risk of getting metabolic syndrome and
having cardiovascular problems?

Should I be taking aspirin therapy?.11

Remember that when you meet with your doctor, tell him or her about all of the medicines, herbs, and supplements you use. "Natural" medicines can be powerful, and they can interfere with the effectiveness of other drugs.

You could also keep a food diary for about a week before your next appointment. Just jot down the foods you eat each day. Then, you and your doctor can go over it together and talk about ways of improving your eating habits.